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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

10/501/93

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| Applicant's or agent's file reference<br>AD6855PCT   | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |  |
| International application No.<br>PCT/US 03/07353   | International filing date (day/month/year)<br>11.03.2003  | Priority date (day/month/year)<br>12.03.2002 |
| International Patent Classification (IPC) or both national classification and IPC<br>B32B17/10 |   |  |
| Applicant<br>E.I. DUPONT DE NEMOURS AND COMPANY  |   |  |

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 7 sheets, including this cover sheet.  
  
☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of sheets.

- This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

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|---|---|
| Date of submission of the demand<br><br>01.10.2003  | Date of completion of this report<br><br>21.06.2004   |
| Name and mailing address of the international preliminary examining authority:<br><br> European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Authorized Officer<br><br>Lindner, T<br><br>Telephone No. +49 89 2399-8976<br><br> |

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US 03/07353

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-18 as originally filed

**Claims, Numbers**

1-8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

**1. Statement**

|                               |             |         |
|-------------------------------|-------------|---------|
| Novelty (N)                   | Yes: Claims | 1-8     |
|                               | No: Claims  |         |
| Inventive step (IS)           | Yes: Claims | 2,4     |
|                               | No: Claims  | 1,3,5-8 |
| Industrial applicability (IA) | Yes: Claims | 1-8     |
|                               | No: Claims  |         |

**2. Citations and explanations**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial  
applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: EP-A-0102502

D2: EP-A-0635538

D3: US-A-4696971

D4: EP-A-0185796

- 2.1 The application concerns a curved laminated article (claim 1) which can be prepared in a conventional process using a vacuum bag (claim 8).  
The interlayer of this article comprises polyvinylbutyral (PVB) which has a hydroxyl number 15 to 25 and which comprises a plasticizer in an amount less than 30 parts per hundred, a surfactant and opt. an antioxidant and/or bleaching agent. The interlayer is characterized in that it was obtained after extrusion at 225° to 245° C and has yellowness index of less than 12.
- 2.2 Relative features such as "small laminate" and "high" curvature cannot be taken into account when assessing compliance with the requirements of **Art. 33(1) PCT**. In the light of the intended use of the laminate structure as aircraft windscreen, these quantitative features are even misleading.
- 2.3 The decisive feature of the invention resides in the use of a particular surfactant, namely dioctyl sulfosuccinate (sold under tradenames such as Geropon, Pelex, Aerosol OT-100, Drewfax).

**Art. 33(2) and (3) PCT**

- 3.1 No objections are raised under Art. 33(2) PCT.
- 3.2 The subject-matter of claims 1, 3, and 5 to 7 lacks an inventive step over the combined teaching of D1 and D2.  
Example 1 of D1 reports on extrusion of a PVB comprising 21 wt.-% of vinyl alcohol units (which determines the hydroxyl number given the definition in ASTM D1396) in the presence of 29 wt.-% (with respect to the total PVB and plasticizer, i.e., about 41 pph) of plasticizer at a maximum temperature of 235° C.  
The resulting yellowness index is 5.

The presence of a surfactant is not explicitly mentioned in D1. However, bearing in

mind the preparation steps of PVB, presence of a surfactant is likely.

- 3.3 D2 deals with PVB films having improved optical properties and reduced yellowing, too (p.2, col.2, ll.35-43).

The ranges for the amounts of plasticizer (preferably 23 to 30 wt.-% of the entire PVB film; col.4, ll.32-36) and the hydroxyl number of the PVB (17 to 29 wt.-%; col.4, ll.1-10) include the amounts employed in Example 1 of D1.

In Examples 1 to 5, the plasticizer was triethylene glycol diheptanoate, whereas triethylene glycol dihexanoate was employed in Example 1 of D1.

The amount of plasticizer in these Examples of D2 corresponds to 35 pph.

D2 further suggests the use of laminates prepared from the disclosed PVB interlayer in aircraft (p.4, col.5, ll.16-24).

If the plasticized PVB disclosed in D2 is suitable as an interlayer in laminated aircraft windows (requirement of claim 7 of the present application), this lends itself to the conclusion that it is also capable of forming a curved article (feature of present claim 1).

- 3.3 Claim 1 of the present set of claims restricts the amount of plasticizer to less than about 30 pph.

In Example 1 of the present application, the amount of plasticizer appears to have been 35 pph - see page 16, lines 26 to 28 - and apparently is not decisive for attaining low yellowness index.

As can be seen from comparison of Examples 1 and 2, the effect of reducing the amount of plasticizer 3GO (triethylene glycol di(2-ethylhexanoate)) to 20 pph on yellowness index is present (reduction from 5.85 to 5.05), but the impact on yellowness owing to the choice of the surfactant is much higher as indicated by Comparative Example 1 (increase from 5.85 to 25.05 when replacing dioctyl sodium sulfosuccinate by sodium lauryl sulfate).

Reducing the amount of 3GO plasticizer to 24 pph when using sodium lauryl sulfate even worsens the result as demonstrated by Comparative Example C2 (provided that this was not caused by the potassium salt - see below).

- 3.4 The basic teaching of D1 is to add a phosphite ester in order to reduce yellowing of PVB in the presence of alkaline salts such as potassium acetate - see page 1, lines 21 to 24 and top of page 2.

Melt temperature upon extrusion in the Examples of D1 is at most 235° C in Example 1 and 200° or 210° C in Examples 3 and 4, respectively.

- 3.5 D2 has the same object of reduced yellowing and - as D1 - points to potassium salts as a possible source of yellowing (p.2, col.1, ll.27-36).

Melt temperature is 200° C in Examples 1 to 5 (p.4, col.6, ll.3-7)

Thus, having regard to a melt temperature of 210° to 215° C at the slot die in present Example 1, no fundamental difference can be detected.

If these features of the interlayer characterize the claimed laminate, then the subject-matter of claims 1, 3, and 5 to 7 is obvious in the light of the combined teaching of D1 and D2 (**Art. 33(3) PCT**).

- 4.1 On the other hand, it has to be concluded that the amount of plasticizer is of minor importance and that the yellowing index predominantly depends on the appropriate choice of the surfactant.

- 4.2 Whether dioctyl sulfosuccinate is designated surfactant or bleaching compound as in present claims 2 and 4, respectively, or is denominated emulsifying agent as in the state of the art is immaterial.

The benefits resulting from the use of dioctyl sulfosuccinate during preparation of a PVB resin are already detailed in D3 - see column 2, lines 15 to 53, Summary of the Invention, in particular the last paragraph which mentions increased laminar and support strength, stiffness and transparency.

The decisive role of this surfactant - not anyone - in the PVB interlayer is a feature which is not reflected by the present independent claim(s).

The finding that the presence of dioctyl sulfosuccinate is capable of suppressing discoloration of PVB which is subjected to harsh processing conditions is regarded to be surprising and not to be derivable from the state of the art as documented by the international search report.

- 4.2 The method according to which the article of claim 8 is obtained is a conventional

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one (cf. D4, p.17, II.3-24).

The subject-matter of claim 8 when taken alone is regarded not to involve an inventive step.

**Miscellaneous**

- 5.1 The disclosure of D1 and D2 has not been acknowledged in the description (**Rule 5.1 (a) (ii) PCT**).
- 5.2 Relative features such as "small laminate" and "high" curvature detract from clarity of claim 1 and the abbreviation "DOSS" should be avoided in the set of claims (**Art. 6 PCT**).